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To: [Burt Shephard/R10/USEPA/US@EPA](#); [Robert W. Gensemer](#)
Cc: [Carrie A. Smith](#); [Eric Blischke/R10/USEPA/US@EPA](#); [Joe Goulet/R10/USEPA/US@EPA](#); [jeremy_buck@fws.gov](#)
Subject: RE: Revisions to exposure table and text
Date: 02/08/2008 11:37 AM

You know I think we need to discuss this - it is really hard to do this by e-mail. I need to review the exposure tables again, but the relevant spatial scope of the fish (home range) is implicit in the direction. However, we may need to make it explicit and very clear, and as I said in my earlier e-mail re-write the refined screen section to match this. The dietary composition is bypassed on purpose in the "refined screen" in the exposure tables by using acceptable tissue values (in prey). This screen will allow us to focus our efforts on the areas and species that need further analysis in the baseline using, as is described in the table, probabilistic methods. We do not want to get into arguments about "10% of this and 2.3% of that" because we think it is adding too much confidence in the modeled prey composition and would rather go probabilistic at this point. I agree we need to specify how this should be done (distributions, etc.) however, we realized we would not have time to do that under the schedule we were working under and put some generic language in there that this step should be performed with consultation with the government team. If we want specifics we will need to start working on that. However, even if we don't add more specifics, I do think we need to revise and build on what is in the tables and explicitly link it to the current problem formulation text.

-Jennifer

-----Original Message-----

From: Shephard.Burt@epamail.epa.gov
[mailto:Shephard.Burt@epamail.epa.gov]
Sent: Friday, February 08, 2008 10:04 AM
To: Robert W. Gensemer
Cc: Carrie A. Smith; Blischke.Eric@epamail.epa.gov;
Goulet.Joe@epamail.epa.gov; PETERSON Jenn L
Subject: RE: Revisions to exposure table and text

After reviewing the exposure table yesterday, it finally struck me what's missing from the table. For some receptors, particularly fish, not all of the exposure parameters needed to perform what we're asking for in the BERA are present. This particularly was noticeable when comparing the wildlife (bird and mammal) writeups to the earlier fish sections in the table. Specifically, the Government team recommendations for wildlife give exposure point concentrations for fish that are prey as a range of river miles (generally 1 or 3 mile segment lengths), however, this same analysis is not given in the fish dietary exposure section earlier in the table. Fish home ranges are not given in either our exposure table or in the LWG Round 2 report, where they assume statewide use by fish species. We've had some informal discussions about home ranges for some fish species (e.g. pikeminnow and sturgeon use the entire site, bass have a 1 mile home range on one side of the river, carp have a 3 mile range, sculpins have a 300 to 500 foot range), but none of this is captured in the exposure table. Since the fish dietary ingestion calculations are based on prey concentrations, we'll need to define fish home ranges so we can tell LWG how large an area they need to pull data, such as sediment data for those bottom fish that ingest some amount of sediment, from which the LWG can estimate EPCs for some of the exposure parameters that go into the dietary ingestion rate calculation.

The other large item missing from the exposure table is, for exposure parameters where we're asking the LWG to probabilistically vary some exposure items (e.g. prey in the mink diet), we do not provide the range or boundaries of the parameters we are asking LWG to vary. Nor are we providing guidance on the statistical distributions to use for each parameter we're asking them to vary.

My view from 30,000 feet view of the exposure table is that it does a great job of justifying how we want LWG to characterize exposure in the BERA, but lacks detail and still needs work on specific exposure parameters for the various receptors.

One suggestion I have is to generate a second exposure table, limited to the numerical exposure parameters needed for risk characterization. This table should have the following column headers:

Target ecological receptor
Body weight
Home range
Water ingestion rate
Sediment ingestion rate
Food ingestion rate
Dietary composition (i.e. 10% pikeminnow, 30% bass, etc.)

Such a table can also have in parenthesis the range of values for these parameters we want LWG to use when they vary exposure parameters probabilistically. This table only needs to include data for those target receptors (fish and wildlife) where dietary exposure is a measurement endpoint. Aquatic plants, amphibians, benthic invertebrates and fish where we're not doing dietary assessments of risk don't need to be in here, although they could be if the home range column is used to identify EPCs for species or media where risks will be evaluated on either a sitewide basis (e.g. pikeminnow), where statistical summaries of sitewide data will generate EPCs, or for those species for which

risks will be evaluated on a sample by sample basis (e.g. surface water, sediment for benthic inverts).

Unless theoretical or empirical knowledge dictate otherwise, input distributions will be assigned as follows:

- lognormal distributions for variables that are right skewed with a lower bound of zero and no upper bound (e.g., tissue concentrations),
- beta distributions for variables bounded by zero and one (e.g., proportion of a prey item in the diet),
- normal distributions for variables that are symmetric and not bounded by an upper limit (e.g., body weight),
- point estimates for minor variables

For some input variables, however, it is likely to be difficult to precisely specify the distribution parameters because of limited data availability (e.g., diet of opportunistic predators). In these cases, bounds can be specified that incorporate all possible values for the variable (e.g. triangular distribution).

Finally, we need to be very explicit that LWG is not to use geospatial statistics (e.g. SWACs from Thiessen polygons) to estimate EPCs for any ecological receptor or exposure pathway. They need to use the standard mean and UCL estimates from normal, lognormal, or whatever statistical distribution is appropriate for a given data set. Such a statement is also not yet in the exposure table or text.

Best regards,

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"If your experiment needs statistics to analyze the results, then you ought to have done a better experiment"
- Ernest Rutherford